TUTTLE (JAS. P.)

Internal Derangements of the Joints, including Loose or Movable Bodies.

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REPRINTED FROM THE

New York Medical Journal

for December 3, 1892.

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INTERNAL DERANGEMENTS OF THE JOINTS, INCLUDING LOOSE OR MOVABLE BODIES.

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The impunity with which the joints may be opened under antiseptic precautions has offered such increased facilities for studying their internal derangements that what were once threadbare subjects possess anew deep interest for the practitioner. The diagnosis, pathology, and treatment of the so-called "floating cartilages" has long occupied the attention of surgeons and furnished the ground for so many differences of opinion that it will be interesting to observe what light our modern methods have shed upon this subject. It would be impossible in the space of a journal article to do more than outline the recent work which has been done in this field. I shall therefore confine myself to the briefest possible statements of the facts which have been established or revealed by the modern methods of research.

It may be well to state in the beginning that I consider all statistics based on work done prior to the general acceptance and practice of antiseptic technique as worthless

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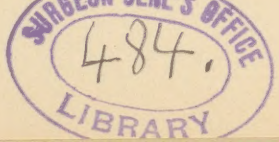

at present, except for purposes of comparison. I have therefore limited the work from which I draw my facts to the period from January 1, 1885, to the present date, assuming that this period covers about all of our experience in the systematic and general practice of antiseptic surgery. Ten years ago a man might have suffered from never so clearly marked symptoms of movable body in the joint, and yet if that body could not be felt and outlined, it would have been considered reckless surgery to open the cavity in search of it. We have learned, however, that these symptoms are not confined to floating cartilages and pedunculated bodies suspended in the synovia, but may be produced by various other derangements of the joint which it would be impossible to make out by palpation, manipulation, or indeed by any other method than the ocular or tactile examination of the internal arrangement of the joint. We may therefore include all these conditions, as Dr. H. W. Allingham has done, under the general term "internal derangements" of the joints. It may serve to get more closely at our subject to divide this into—

1. Derangements due to the normal constituents of the joint.

2. Derangements due to abnormal constituents.

Under the first of these we embrace all those disorders due to injury, disease, or displacements of the ligaments or cartilages of the joints.

Under the second we include all those conditions due to the development in the joint of abnormal bodies or the abnormal development of the villous fringes therein.

These disorders occur in the elbow, wrist, and other joints, but they are so much more frequent in the knee that most of our observations and facts are drawn from it.

The most important of the first variety are the *derangements of the semilunar cartilages* of the knee joint.

Dislocation of these bodies has long been recognized as of somewhat frequent occurrence, and treated as of insignificant importance. They have been replaced, if possible, often only to be dislocated again; and where it was not possible to reduce the dislocation, they have been left and a splint or cap applied to the joint to restrain motion as much as possible. The diagnosis and reduction are not so simple as the descriptions of Holmes, Agnew, Gross, and other surgical authorities would lead us to believe, and they vary a great deal more in their character than we have heretofore been led to suppose. Their displacement may be very partial, and yet the loosened end or border may seriously interfere with functional use of the joint, and set up a chronic or subacute synovitis whenever the joint is used. Annandale has led the way in the study of these derangements and has reported five cases where he has opened the joint for them and found various disorders—tearing, folding, fracture, twisting of the cartilages. While a derangement of the cartilage had been surmised, it was impossible to learn exactly the condition till the joint had been opened. Mr. Herbert Allingham, following in the line of the former, has made an extensive study of these derangements, and his views are set forth at length in a brochure published by him in 1889. It has been shown that the internal cartilage is much more frequently deranged than the external. This may be explained by the fact that the tibia is usually fixed and the femur movable in the injuries that cause this derangement, and the internal cartilage, being less firmly attached to the tibia, is torn from its attachment by the force of the moving femur.

The cartilage may be detached from (1) the coronary ligaments; (2) their anterior attachment; (3) their posterior attachment; (4) the coronary ligaments and posterior attachment; (5) the coronary ligament and anterior attach-

ment. They may not be entirely detached, but their ligaments may be stretched to such a degree that they become pinched by the movements of the joints. They may be broken, split, or torn into ribbons. The displacements may be produced by any forcible movement which carries the thigh inward while the foot is turned outward, or by sudden bending of the knee while the foot is rotated outward or inward, the former injuring the internal and the latter the external cartilage. The breaking or tearing of the cartilages is usually produced by a stroke upon the joint while standing on one leg. The mechanism and predisposing causes, such as relaxed ligaments, previous synovitis, rheumatism, etc., are discussed at length by Mr. Allingham in the paper referred to above. The symptoms of these injuries have much in common with what is usually termed sprain or strain of the joint, and the two conditions are frequently taken for each other. They are: history of injury; tenderness above the head of the tibia; inability to extend the limb completely; protuberance or depression upon one side or the other of the patella tendon when the leg is extended; acute pain as if something was jammed between the bones on forcible extension; difficulty and pain in straightening the limb after prolonged flexion; inability to walk up stairs rapidly, or to run; more or less lameness; and sometimes when the limb is forcibly flexed there may be a click or snap which is produced by the cartilage slipping back into place. These symptoms may all disappear and recur upon the slightest provocation—such, for instance, as crossing one leg over the other—until the condition becomes chronic and a subacute synovitis is set up, disabling the patient entirely and demanding radical interference.

The diagnosis between the different forms of derangement depends largely upon delicacy of touch and accuracy

of observation. If the cartilage is completely torn away it may be felt in some remote portion of the joint as a floating body, and there will be a space between the femur and head of the tibia on the side from which it was torn; lack of similarity between the two joints may be detected by touch and observation. Where the anterior attachment is severed there may be an abnormal space between the bones, or the cartilage may protrude so that the surgeon may by pressure extend it over the head of the tibia. Where the posterior attachment has been torn, complete flexion will be interfered with and there will be a protuberance on the extero-posterior or intero-posterior aspect of the joint according to which cartilage is deranged. Where the coronary ligaments are torn and the cartilage is situated in the intercondyloid notch, Mr. Allingham says that when the leg is semiflexed and everted on the thigh there is an increased interval between the femur and tibia upon the internal or external side according to the seat of the injury. While the differentiation is not always absolutely correct, much may be accomplished in diagnosis by careful attention to the above points, and proper management in time may prevent a trivial injury becoming a permanent disability.

Treatment.—When the injury is of very recent occurrence and the symptoms are acute, an attempt should always be made to reduce the dislocated cartilage or piece thereof. This may generally be done without an anæsthetic, but sometimes this will be necessary. The evidences of reduction having been accomplished will be a click heard upon the cartilage slipping into place and the patient's ability to completely flex or extend the leg with little or no pain. The methods of reduction are as follows:

1. Flex the leg forcibly and then suddenly extend it.
2. Flex the leg slowly with constant pressure on the

deranged cartilage by the fingers, thus trying to force it into place; the foot should be everted for the internal cartilage and inverted for the external cartilage in this method. The leg should then be suddenly extended.

3. "Flex the leg as much as possible on the thigh, drawing upon the tibia as if to separate the articular surface from the femur. Then rotate the tibia inward if the internal cartilage be displaced, and outward if the external cartilage be displaced. Both movements should be resorted to if the usual one does not succeed. Then extend the leg on the thigh quickly, but not with any great violence, at the same time pressing with the thumb upon the projecting cartilage." [Allingham.]

4. Place some body, such as the edge of a table or an assistant's arm, in the popliteal space for a fulcrum, flex and draw down on the leg, at the same time rotating it and pressing on the projecting cartilage.

There are a number of variations of these methods described by different authors, but these four embrace all the essential procedures. When the cartilage returns to its position there may occasionally be heard, as said above, a click like the slipping of a bone into place; but this sound is not at all constant. The leg should be placed upon a splint extending from the thigh to the foot, and antiphlogistic remedies applied to the joint until all inflammatory symptoms have subsided, after which a plaster-of-Paris splint, including the foot, should be applied so as to control all motion of the joint, and the patient may be allowed to go about. This should be worn for from six to eight weeks.

So much for the acute form of these derangements, but it is the chronic form with which the profession is less familiar and to the management of which so much study has been devoted during the past ten years. After a carti-

lage has once been displaced the accident is very apt to recur, especially if any of the attachments have been torn; if the cartilage itself has been broken or torn, our efforts at replacement will be all in vain, and the patient's disability will reappear immediately upon taking off the splint. Operative procedure is the only course that offers us any hopes of cure in these cases. The unfortunate results of opening the joint before the days of antiseptic surgery have made the profession chary of operating in such cases. The statistics which I shall present further on in this paper, however, will show how groundless is this fear. The joints are but serous cavities and may be opened with greater impunity than the abdomen under proper antiseptic precautions. We need no longer dread these operations and their results. After properly diagnosticating our cases and excluding those in which age or other conditions contra-indicate operation, we should proceed at once to relieve them by fixation or removal of these displaced cartilages. I shall not go into the minutiæ of the antiseptic methods of opening the joint in these operations. Two or three points may be mentioned, however, as of special importance. It is generally best to open the joint by a longitudinal incision, half an inch to three quarters of an inch from the patellar tendon; all bleeding should be checked before the joint is opened; the edges of the synovial membrane should be carefully secured by thread retractors—loops of antiseptic silk—before searching the joint is begun. After the joint has been thus opened, the surgeon should ascertain exactly what is the condition of the cartilage, and then only can he decide upon what operation is to be done. If the cartilage is split or torn to ribbons, if all the coronary ligaments are torn away and the cartilage is folded and creased so that it can not be smoothed out, or if the anterior attachment and the coronary ligaments are both torn away, the cartilage should

be removed as completely as possible. This is best accomplished by grasping the cartilage with a fixation forceps and drawing it outward and upward as far as possible. While it is held in this position by an assistant, the surgeon slips his left forefinger along its border and guides the scissors to the posterior attachment, which he clips off as closely to the tibia as possible. This operation is termed by Annandale "chondrectomy."

If the coronary ligaments are torn, but the cartilage is not crumpled up, Mr. Allingham sometimes sutures the cartilage to the head of the tibia, as is advised in the succeeding injuries. Although I have had no experience with this method, I should consider it at least a very uncertain procedure.

If the anterior attachment alone is torn, or if the coronary ligaments are stretched so as to allow too free movement and consequent puckering of the cartilage, the latter should be sutured so as to hold it in position. This operation is called "chondrorrhaphy," and is done by drawing the cartilage gently toward the wound and holding it firmly there while a Peaslee's or some similar needle is passed through the fibrous tissue surrounding the head of the tibia, beginning about half an inch from the top, and through the cartilage. The needle is then threaded with chromicized gut and withdrawn. The suture is then tightly tied. After either of the above-mentioned operations the joint should be irrigated with a 1-to-40 warm solution of carbolic acid until all evidence of bleeding disappears, and then closed *secundum artem*. Mr. Allingham includes the skin, synovial membrane, and the intervening tissues all in the same sutures; but the majority of operators prefer to close the joint cavity by a separate row of gut sutures in the synovial membrane, and include the other tissues in another. As to drainage, I confess that when I began the study of this subject I was

prejudiced by my own experience against the leaving of drainage-tubes in the joints. After going over the history of a large number of cases, however, I must say that I am unable to conclude that the tube does any injury or retards in any appreciable degree the recovery. In one or two cases where it has been omitted, effusion into the joint has given the patient much pain and the surgeon needless anxiety. It may, I think, be laid down as a broad, general rule that where cutting, suturing, or much fingering within the joint has been done a small drainage-tube should always be inserted in the lower angle of the wound; if the joint has been simply opened and a floating body removed, the result will probably be equally good without it, and its omission will obviate the necessity of dressing the wound within forty-eight hours. The wound should be dressed antiseptically and the limb placed on a posterior splint almost straight. If no drainage-tube has been used, dressing will not be necessary for eight or ten days, when the wound will generally be found healed, unless there should be an elevation of temperature above 101° F., when it should be opened and treated as described below. If a tube is employed, the dressing should be removed after thirty-six to forty-eight hours; if there is no evidence of synovitis, the tube should be withdrawn at this time, a small pledget of iodoform gauze stuffed into the hole down to the synovial membrane, and an antiseptic dressing applied every three or four days. When the temperature rises above 101°, the dressing should be removed and the joint irrigated with a two-and-a-half-per-cent. solution of carbolic acid. If no tube has been used, it will be necessary to open the lower angle of the wound to accomplish this. There is a difference of opinion among operators as to how long the limb should be confined after the operation. Here, again, the operation which has been done should govern largely. If

the cartilage has been removed, the joint may be liberated and brought into use earlier than if suturing has been done. In the first case passive movements may be begun at the end of the first week, and the patient may be allowed to use his leg as soon as there is no pain in bearing his weight upon it. Where the cartilage has been sutured, however, the joint should be kept absolutely quiet for four or five weeks, and its use should not be allowed under six weeks. The external sutures should be removed in five or six days if they are of silk. These remarks upon the treatment of the wound will apply to all the derangements of which I shall speak, and it will not be necessary to repeat them.

The above-mentioned derangements are, of course, confined to the knee joint, and have no analogues in the other joints. I do not propose in this paper to treat of those derangements of joints due to the relation of the parts having been altered by fracture of the bones, but where the injury has occurred entirely within the joint they come properly within the limits of our subject.

The second class of derangements which I shall notice is that of the articular cartilages themselves. After a severe twisting or jamming together of the articular surfaces of a joint, there sometimes occurs a more or less severe synovitis which subsides promptly enough under proper treatment, but leaves a limitation to the movement of the joint. Forcible manipulation will sometimes overcome this and restore the joint to perfect usefulness, but it occasionally happens that no reasonable amount of force will do so, and we are confronted with the question, Shall we open the joint or leave the patient to suffer, not only from the inconveniences of an imperfect joint, but also from recurring attacks of synovitis? When, as formerly, opening the joint resulted in a large percentage of deaths or stiff joints, a great responsibility rested upon the surgeon in deciding this

question; but now, when the mortality is less than one per cent. and ankylosis less than four per cent., a greater responsibility still will rest upon him if he fails to give his patient the benefit of all that modern science has provided for him. These should all be opened under proper antiseptic precautions and the derangement remedied if possible. I have seen three such cases—two in the elbow and one in the wrist—in which the injuries were identical in character and consisted in partial chipping off of small fragments of the articular cartilage, and twisting it about into an abnormal position in the joint between the articulating surfaces. The joints having been kept at rest after the injuries, these particles became more or less firmly fixed in their new positions, and when the patients began to use the limbs again they obstructed motion. After failure to break up what was taken to be adhesions, the joints were opened and the above conditions discovered. In two the offending fragments were removed by a periosteal elevator and dressing forceps, but in the third the adhesion was so strong that it was necessary to dissect it off with scissors. An almost perfect result was obtained in every case. It is not necessary to go into the details of these cases. Such an injury may occur in any of the joints. When the fragment is completely detached it becomes a floating cartilage, and of such I shall speak later.

A third derangement of the joints is that described by Dr. R. F. Weir (*Medical Record*, July 16, 1892), in a late paper before the Section in Surgery of the New York Academy of Medicine. It consists in a duplication of the fibrous membrane from the surface of the patella and the adjoining articular surface of the femur. The folds were of sufficient length to be caught between the tibia and femur upon flexion. In one case there was an obscure history of injury and mild synovitis, and in the other a

rheumatic diathesis to account for the hypertrophy. The symptoms first noticed in both cases were grating and roughness in the joint, accompanied by limitation of motion. In one there was inability to flex the limb after completely extending it, until the foot had been rested on the floor and the quadriceps extensor muscle relaxed. There was also difficulty in extension after complete flexion, but not so great as in the reverse motion. In the other case there was a locking of the joint at a point midway between flexion and extension, which could only be relieved by relaxing the quadriceps and pushing the patella upward. In general, the symptoms were those of a pedunculated body in the joint. Both cases were operated on by opening the joint and removing the hypertrophied folds with forceps and scissors. In one a drainage-tube was used and the patient recovered without any complications; in the other it was not used, and after forty-eight hours it was necessary to enlarge the opening in the synovial membrane to let out the accumulated serous fluid. The result in both cases was good. Such a condition might occur in the wrist, elbow hip, or ankle joints, and it will be well for surgeons to bear it in mind.

Derangements of the Knee Joint due to the Alar Ligaments.—Of this class of derangements little has been written, and indeed, until Dr. Allingham's paper above referred to, their existence had not been well established, and nothing of importance has been written on the subject since that paper. According to him, the ligament may be enlarged from inflammation or hæmorrhage into it; it may be elongated; it may possibly be torn away, or a cyst or new growth may be developed therein, and as a result—

1. It may be pinched between the condyles of the femur and the semilunar cartilages.

2. It may interfere with the movements of the joint,

cause the puckering of the semilunar cartilage, and then itself be pinched between the latter and the ligamentum mucosum.

3. It may be pushed into the joint by a thickened ligamentum patellæ and be nipped. Dr. Weir has reported a case (*American Medical Review*, June 26, 1886) which appears to be of this nature, but it is not distinctly described as such. Dr. Shattock has reported (*Lancet*, 1888, i, p. 775) a case of hæmorrhage into the alar ligament with disability and symptoms of dislocated cartilage. Dr. Bowlby has reported a like case, also one of inflammatory thickening of the ligament.

The symptoms are obscure; there is usually pain referred to one side of or immediately beneath the patella, with more or less swelling of the joint, a catching of the joint upon flexion and extension, a sudden giving way of the knee, accompanied by a sickening pain and followed by more or less synovitis, as in movable bodies of the joint. If, after rest, antiphlogistics, or counter-irritants, the pain returns upon resuming the use of the limb, an exploratory operation should be resorted to. If the alar ligament be found elongated and hypertrophied, it should be torn loose from its internal attachment—if, indeed, such has not already taken place—drawn well into the lower angle of the wound, and sutured firmly to the skin, the protruding portion being cut off with scissors. It would be dangerous to cut it off and leave the stump in the joint, as it contains an artery which might bleed into the cavity, and, moreover, as Dr. Allingham says, it would leave a surface uncovered by synovial membrane which might suppurate and thus destroy the joint. The two cases reported by him were clearly of this nature and the result of his treatment was perfectly satisfactory.

Time and space forbid my describing particularly "rheumatic thickening of the synovial membrane," tuber-

cular alterations of the joints, and hydrops articulorum. They are all described in special treatises and works on general surgery. We may proceed, therefore, to the second class of derangements—viz., those due to abnormal developments in the joints. These are all of the nature of floating, movable, or pedunculated bodies in the joints, and differ more in their pathology than in their symptoms.

The principal varieties are:

1. *Fibrinous.*—These may be loose and floating or movable and attached to the joint surface, as may all of the succeeding forms. They are the melon-seed bodies of Hunter, and result (*a*) from flakes of fibrin in exudations attending synovitis of either traumatic or rheumatic origin. (*b*) From condensation of the fibrin of the synovia about a foreign body or clot of blood—*e. g.*, a needle, as reported by Dr. Shaw (*Trans. of the Path. Soc. of London*, vi, p. 328). It is doubtful if blood clots can produce these bodies, but extravasation into one of the villi and subsequent breaking off can do so.

2. *Fibrous.*—These arise from hyperplasia and detachment of the synovial villi or folds of the synovial membrane. They were described by Virchow as fibromata of the joints, and are composed of pure fibrous tissue without any tendency to osseous or calcareous change.

3. *Cartilaginous.*—These result from fractures or fragmentary exfoliation of articular cartilages. König has cited three such cases in the elbow joint (*Deutsch. Zeit. f. Chir.*, 1887–'88, p. 90), and Clark one, characterized by a piece of the patella being broken off into the knee joint (*Trans. of the Path. Soc. of London*, 1890–'91, p. 271); they may arise also from the detachment of ecchondroses in arthritis deformans. As many as four hundred of these have been taken from one joint. The size varies from that of a mustard seed to that of a pullet's egg.

4. *The Fibro-cartilaginous* arise from the synovial fringes of the joints. Cartilage cells are so frequent in the villi at the point where the synovial membrane is reflected upon itself that they may be said to be normal. Under the influence of inflammation these cells proliferate and form movable bodies which may break off into the joint or remain attached. In some, true bone forms in the center, the cartilage cells being arranged vertically immediately around it, and flattened out at a distance. When this occurs, the body is osteo-cartilaginous and belongs to that class.

5. *The Osteo-cartilaginous* arise from further development of the cartilage cells in the villi, as described by Rokitansky and Virchow, and referred to above; also from osteophytes or ecchondroses due to rheumatic or osteo-arthritis. Poulet and Villard (*Arch. d. phys.*, v, 1885) examined six cases of movable pedunculated bodies in diseased joints, and found them to consist of cartilage and bone, and to have originated in osteophytes which had undergone varying degrees of separation. The similarity of these to the loose bodies following injury led them to study the mode of development of these ecchondroses and osteophytes in diseased conditions of the joints. They found, in various stages of development, nodules of cartilage projecting from the articular borders, a sort of lipping of the border, as it were, covered by a fibrous membrane, continuous on one side with the periosteum and on the other with the synovial membrane. In the center of these nodules were bony nuclei with more or less dense trabeculæ and closely connected with the cancellous tissue of the epiphysis. Fracture through the neck of these nodules produces joint bodies which may be torn entirely loose and float in the synovial fluid, or may remain attached by their fibrous envelopes and simply be pedunculated movable bodies. These fibro-bony bodies continue to grow in size

by imbibition, although entirely detached, but necrotic and traumatic joint bodies have a tendency to absorption. I am aware that Cooper, Recklinghausen, Poncet, and others deny this growth of unattached bodies, but Virchow admits its possibility, and Poulet, Villard, and Pattison (*Jour. Anat. and Phys.*, xxiv, p. 360) have actually observed it. These bodies are also said to result from quiet necrosis and sequestration of a portion of the articular surfaces, as first described by Sir James Paget (*Trans. of the Path. Soc. of London*, 1889–'90, p. 204; *Med. Record*, 1891, p. 700).

This mode of origin has been vigorously attacked of late by Mr. Humphreys (*Brit. Med. Jour.*, 1888, ii, 707), and with good reason I believe. The fact that there is a depression in the articular cartilage into which one of the loose bodies fits, does not prove, as Mr. Teale maintains (*Med. chir. Trans.*, 1885, p. 31), that it originated by necrosis at that spot. A body developing from the alar ligaments or from the villi may work for itself, while growing, a nest or resting place in the soft cartilage and not interfere with motion. But when by violence it is once displaced, it may interfere. It does not follow, though, that it is due to necrosis, unless a necrotic base be left from which it was detached, and such a case has not yet been demonstrated.

6. *Tubercular Bodies.*—These bodies are really fibrous, containing giant cells and tubercular deposits. They result from tubercular deposits in the synovial villi (*Brit. Med. Jour.*, 1891, i, 522), and are associated with other forms of tubercular disease of the joints.

7. *Lipomatous Bodies.*—These result from (*a*) hyperplasia of the fat about the alar ligaments; (*b*) hyperplasia and herniation into the joint of the extrasynovial fat; (*c*) fatty degeneration of hypertrophied villi; (*d*) the lipoma arborescens of Müller.

Symptoms.—The symptoms accompanying these various forms of derangement are very similar. Excluding traumatic cases, loose or movable bodies can not exist in the joint not already diseased, and they often furnish the only evidence of pre-existing disease. Sir Benjamin Brodie first established the relation of the rheumatic diathesis to these bodies (*Path. and Surg. Observ.*, 1850, p. 261), and Rokitansky showed the relation of the cartilage cells in the villi to the osteo-cartilaginous variety (*Zeit. Wiener Aerzt.*, 1851). Unless there is a distinct history of injury or disease the patient is usually ignorant of any derangement of the joint. If there be such a history, examination of the joint may reveal to him the presence of a movable body. He is usually, however, made aware of its presence by its sudden and unexpected interference with motion. The body is caught between the articular surfaces of the joint and locks it at that point so firmly that the patient can neither flex nor extend the limb until the muscles are all relaxed. The pain which it causes is usually less severe in the wrist and elbow than in the knee. Here the cartilage is caught and pinched by the whole weight of the body, which causes an acute, sickening pain, the leg gives way and the patient may fall. He is unable to move the limb himself, and if the surgeon attempts to do so by force the suffering is intense. After relaxation, a night's rest, or under anæsthesia, the limb may be moved freely and the patient be mystified by the whole occurrence. Usually, however, there will follow a more or less severe synovitis and effusion into the joint, which will subside under appropriate treatment, and the patient may go for an indefinite period without a recurrence of the accident. These bodies, however, seem to enjoy being pinched, for when they once begin to interfere with the joint they continue to do so more or less frequently until they are removed.

Manipulation and examination of the joint after such an accident usually reveals to the surgeon, or even the patient himself, the presence of a movable body. The points at which they are most frequently felt are just beneath the quadriceps or upon either side of the patellar tendon. I have one under charge at present in which the body is attached about the level of the articular surface of the tibia. The symptoms are not so severe in the fibrous variety as with the organized bodies. There may be moist friction when the joint is moved or when the patella is pressed upon in this variety of derangement, and the bodies, being so smooth and freely movable, recede from the touch and are difficult to make out. Yet the subjective symptoms are sufficient to base a diagnosis upon and justify a radical or exploratory operation.

Treatment.—The management of these cases and the result thereof at the present day as compared with previous periods is the most important point of this paper. Rest in bed until the acute inflammation subsides is still the method all conscientious surgeons will advise at first, either putting the limb in splints or applying other antiphlogistic remedies. But from this point the paths of the old and new methods diverge. Formerly the body was sought for, pushed if possible to some point of the synovial sac remote from the articular surfaces, and there fixed, if possible, by bandages, adhesive plaster, and other appliances; a blister or actual cautery was applied over the point to set up a synovitis and consequent adhesions. The limb was inclosed in plaster or other variety of splint and so kept quiet for weeks or even months. After prolonged trial of such temporizing means, in vain, some bold surgeon would open the joint subcutaneously and try to slip the body into the subcutaneous cellular tissue, while others, still bolder, cut into the joint and removed the body complete. This was never

done, however, until the body was caught and fixed, and then only as a last resort, where the patient's life was made miserable and his usefulness impaired by the derangement. Such methods of fixation may be tried now, but it should always be done with the patient's positive appreciation of the improbability of a favorable result. At the present day, however, when a joint may be opened with so little danger, it is the duty of the surgeon, when a diagnosis of a movable body has been made, to insist upon its immediate removal. The frequent pinching which is likely to occur may set up inflammatory action in the joint which is far more likely to impair or destroy its usefulness than a clean antiseptic opening thereof; and the dangers and confinement consequent upon an operation are infinitely less than those of palliative treatment, not to mention the uncertainty of the latter. These bodies grow, moreover, and the sooner they are removed the better for the joint. Even if the body can not be felt, and the symptoms recur, the joint should be opened and explored for attached movable bodies or pedunculated tumors which are out of reach. In hypertrophied villi or fringes consequent upon subacute or chronic inflammation of joints the only diagnostic symptoms may be a creaking or grating of the joint upon movement. These cases are often put aside as chronic rheumatism or inflammation of the joint and left to take their course, whereas operative interference would reveal their true nature and result in absolute cure. An exploratory incision into the joint is as justifiable as one into the abdomen and should be oftener practiced. The point of election for opening the joint is about three fourths of an inch from either side of the patellar tendon, but if the body has been located the incision should be made directly upon it, in a vertical line. The method of opening the joint and its after-treatment are described above and need not be re-

peated here. I shall not consume space in detailing cases. The bold, vigorous, and radical treatment of these derangements has been tried now for seven years, and we may confidently compare its results with those of former years. I am aware that statistics from published cases do not absolutely represent the result in any line of surgery, there being so much greater inducement to publish successful cases than failures. But this disparity is no greater at one period than another, and while large numbers of cases are unreported, it is from printed reports that we must obtain our data. There are no statistics of cases treated without operation, but there is no reason to believe that such treatment is curing any considerable percentage of cases. For comparison, therefore, we are confined to the operative treatment. Benndorf (Agnew's *Surgery*, p. 130) collected 216 cases, of which 143 were cured, 41 died, and 32 failed. Larrey (*Gazette d. hôpit.*, No. 67) brought the record down to 1860 with 167 cases, of which 115 cases were cured, 33 died, and 19 failed. Barwell (*Int. Ency. of Surg.*, vol. iv, p. 345), taking up the subject at this point, brought it down to 1884 with 88 cases, of which 73 were cured, 5 died, and 10 failed. The large increase in the percentage of cures in Barwell's statistics may, I believe, be attributed to the use of antiseptic and aseptic methods which had come into vogue in the larger hospitals during this time. Having taken the year 1885 as the period when such practice was thoroughly established, I have collected 77 cases of operation for movable bodies in the joints, of which 73 were cured, 2 improved, and 2 died, one from acute alcoholism and one from pulmonary tuberculosis. These two can not therefore be properly brought into the comparison. Add to these, 25 cases operated on for derangements of the semilunar cartilages and 7 for derangements of the alar ligaments, and we have 107 cases, of which none died, 104 were

cured, and 3 failed, although not utterly. Observe the percentage and see what a stride has been made since Barwell's report. I have taken every case that I could find published, and if any fatal one has been omitted it has not been intentionally.

	Cases.	Cured.	Failures.	Mortality.
		Per cent.	Per cent.	Per cent.
Benndorf	216	66·2	18·99	14·81
Larrey, 1860	167	68·86	19·76	11·38
Barwell, 1884	88	82·95	5·68	11·36
Tuttle	107	97·19	2·81	.....

If one will look into the comparative merits of the two operations—the direct and indirect—he will see that although the mortality was formerly decreased by the latter, the percentage of failures was relatively much more increased. The uncertainty of the operation makes it unjustifiable at the present day, when the dangers of air entering the joint cavity are done away with by the use of antiseptic agents. With such encouragement before us no patient should be allowed to go about suffering from these internal derangements of the joints, and with such a record antisepsis may claim one of its most glorious victories in the field of joint surgery.

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